CleanAlert
Air System Efficiency Monitors

FILTERSCAN® *WiFi*
Air Filter Monitor

Models FS-245-B & FS-245-C

Reference Guide
Version 3.04

FILTERSCAN® WiFi Air Filter Monitor
CleanAlert
Air System Efficiency Monitors
When Changing the Air Filter
1- Turn system OFF at thermostat
2- Install new air filter
3- Press Zero/Clean button
4- Wait for Red Status
5- Press Zero/Clean button
6- Wait for Status to change from Yellow to Green
7- Turn system ON at thermostat
8- Increase or decrease temperature setting to turn fan ON
9- Wait one minute
10- Press Zero/Clean button
11- Wait for Status to change from Yellow to Green
12- Wait for Green Status to turn OFF
13- Return system to normal temperature setting
CleanAlert products are manufactured under one or more of the following U.S. patents: 7,178,410 & 7,490,512
Contains FCC ID #T9J-RN171 and IC ID #6514A-RN171
Status
Send
Zero/Clean
recommended setting
less often
more often
Service Filter

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Due to CleanAlert's constant pursuit of product improvement, minor discrepancies may exist between the actual product, text, and illustrations. All information contained herein is based on the latest specifications at the time of publication and is subject to change without notice.

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Introduction

Congratulations on your purchase of the CleanAlert **FILTERSCAN® *WiFi* Air Filter Monitor**. The CleanAlert **FILTERSCAN *WiFi* Air Filter Monitor** continuously and automatically monitors the clogging* of an air filter installed into a household or commercial forced air heating, air conditioning, or heat pump system and provides alerts when the filter clogs and needs to be replaced.

The CleanAlert **AirFilterSentry™ Notification Service** will send you a text message alert and or email alert notifying you of the clogging* of an air filter installed into your household or commercial forced air heating, air conditioning, or heat pump system. The system monitoring service is located at www.cleanalertwifi.com where you may register your **FILTERSCAN *WiFi* Air Filter Monitor** and sign up for the CleanAlert **AirFilterSentry** Notification Service. In addition to receiving text and or email notifications, you can check on the status of your air filter as it becomes more and more dirty over time before reaching clogged* status.

***NOTE:** *"Clogging" is defined as when the differential air pressure in the HVAC system doubles from its calibrated clean or new air filter value.*

IMPORTANT! Please read all instructions carefully to insure years of trouble-free operation.

In The Box

1. **FILTERSCAN *WiFi* Air Filter Monitor**, Model FS-245-B or FS-245-C
2. 4 Energizer Ultimate Lithium "AA" Batteries (FS-245-B model only)
3. **Read This First** document - Critical
4. Quick Start Guide
5. Drill Template to locate mounting holes in a return air plenum
6. Mounting Screws
7. Packaging / box

- *Optional:* CA-360 external AC/DC wall adapter power supply. (If ordered for the Model FS-245-B only, it is useful when there is a wall outlet available within 6' of the **FILTERSCAN** mounting location, and it eliminates the need for batteries.)
- *Optional:* CA-4DP Tubing Kit. (If ordered with either FS-245-B or FS-245-C, this 6' long Tubing Kit is used to have the **FILTERSCAN** monitor differential pressure across the air filter. It is especially useful when the **FILTERSCAN** is mounted in an attic or crawl space, or when the air handler is located outside the building (since the **FILTERSCAN** must be mounted indoors). Call or email to order longer length tubing.

Tools Required

1. Power Drill
2. 7/64" Drill bit
3. 3/8" Drill bit or Step Drill
4. #2 Phillips Screwdriver
5. ½" Drill Bit (for Model CA-4DP Tubing Kit only)
6. Eye and Ear Protection
7. Dust Mask

SAFETY

WARNING! READ AND UNDERSTAND ALL INSTRUCTIONS.
Failure to follow all instructions may result in electrical shock or serious personal injury.

Application

FILTERSCAN *WiFi* Air Filter Monitor is an air filter clogging detection system. It has been designed to monitor the change in differential pressure as a result of dirt build up on an air filter and alert the user when the amount of clogging reaches a pre-determined threshold.

The **FILTERSCAN *WiFi* Air Filter Monitor** is compatible with most air filters ranging in differential pressure drop from 0.10”wg to 4.0”wg and with single and multi-speed blower HVAC systems, and most VAV (Variable Air Volume) systems. Note: The Monitor must be mounted downstream if the VAV system is set to the constant torque mode.

The **FILTERSCAN *WiFi* Air Filter Monitor** will transmit status conditions through your wireless Internet router to a cloud-based server database, which in turn sends text and or email alerts to any smartphone (Android or iOS) or other Internet-connected device, such as a laptop, tablet, or desktop computer (PC or Mac). In order to utilize this feature you will need: (1) a wireless router with an operational *WiFi* Protected Setup (WPS) button, or a wireless router without a WPS button, plus a separate *WiFi* enabled device such as a smartphone or laptop, and (2) a subscription to the **AirFilterSentry** (AFS) **Notification Service**. You can check the status of your air filter at any time by logging into your AFS account requesting a Filter Status report.

FCC Compliance

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and the receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

Contains FCC ID Number: **T9J-RN171**

IC Compliance

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme à Industrie Canada exempts de licence RSS norme. Opération est soumis aux deux conditions suivantes: (1) cet appareil ne peut pas causer de brouillage et (2) cet appareil doit accepter toute interférence, y compris les interférences pouvant causer un fonctionnement intempestif du dispositif.

Model: FS-245-B Modèle: FS-245-B
Model: FS-245-C Modèle: FS-245-C
Contains IC Certification/Registration Number: #6514A-RN171
Numéro de Certification / d'enregistrement les IC: #6514A-RN171

Sign Up & Configure AirFilterSentry Notification Service

Enter the Serial Number(s) and MAC Address(es) of your **FILTERSCAN *WiFi*** unit(s), which is(are) located on the back of the Monitor Housing(s) and on the product box.

S/N _____ MAC ____:____:____:____:____:____

S/N _____ MAC ____:____:____:____:____:____

S/N _____ MAC ____:____:____:____:____:____

Please "Register" your **FILTERSCAN *WiFi* Air Filter Monitor** on the CleanAlert **AirFilterSentry Notification Service** website www.cleanalertwifi.com, "Sign Up" for the service, and configure your notification preferences and messages.

1. Select "All Warranty Registration" and enter the requested information (This information is appreciated but not required).
2. Then, if you are installing from one to three Monitors, select "Sign Up For AFS Home/Home+" or if you are installing more than three Monitors, select "Sign Up For AFS Manager" on the Home Page.

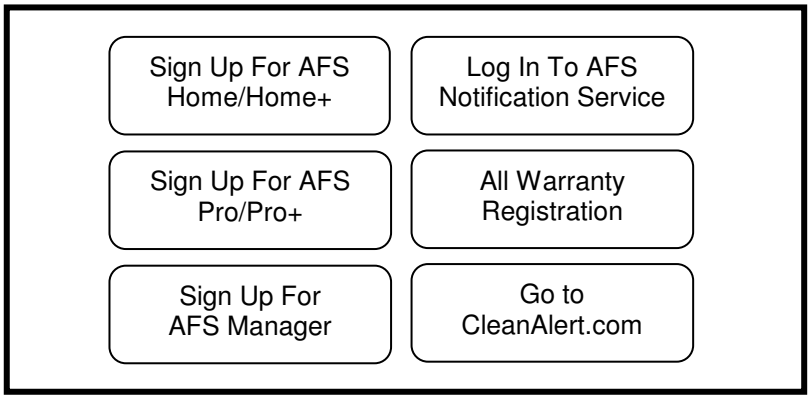
Sign Up For AFS Home/Home+
Log In To AFS Notification Service
Sign Up For AFS Pro/Pro+
All Warranty Registration
Sign Up For AFS Manager
Go to CleanAlert.com

Figure 1: Home Page - Welcome Screen

3. Enter your profile information on the Sign Up page.

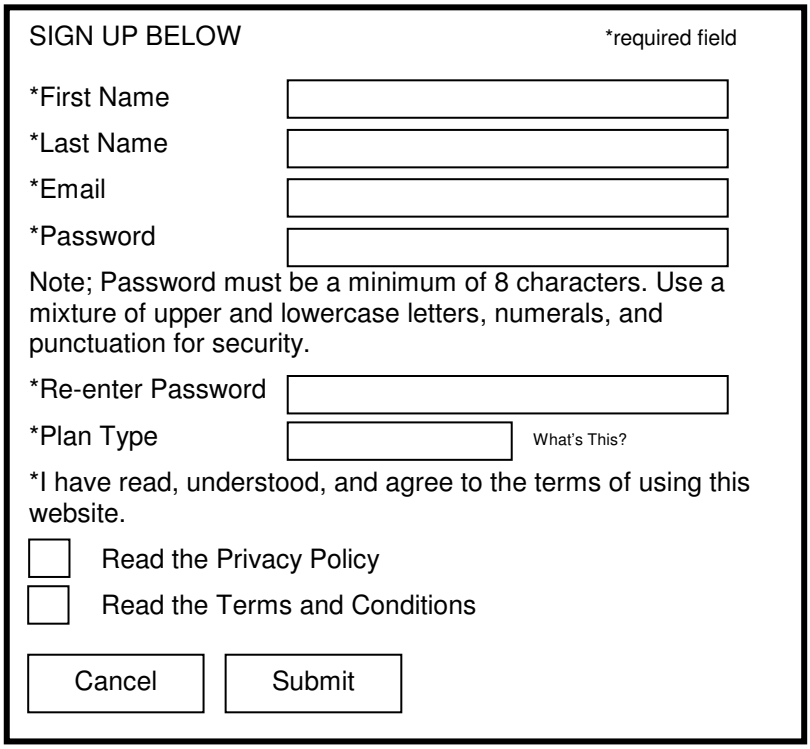
SIGN UP BELOW
*required field
*First Name
*Last Name
*Email
*Password
Note; Password must be a minimum of 8 characters. Use a mixture of upper and lowercase letters, numerals, and punctuation for security.
*Re-enter Password
*Plan Type
What's This?
*I have read, understood, and agree to the terms of using this website.
Read the Privacy Policy
Read the Terms and Conditions
Cancel
Submit

Figure 2: Sign Up Page - Create Login and Password

4. After submitting your profile information on the Sign Up page, you will receive an email with an activation link. Upon clicking on that link your browser will open as seen below. Note: The email entered upon Sign Up must be correct, otherwise you will not receive this confirmation email and will have to start the Sign Up process again.

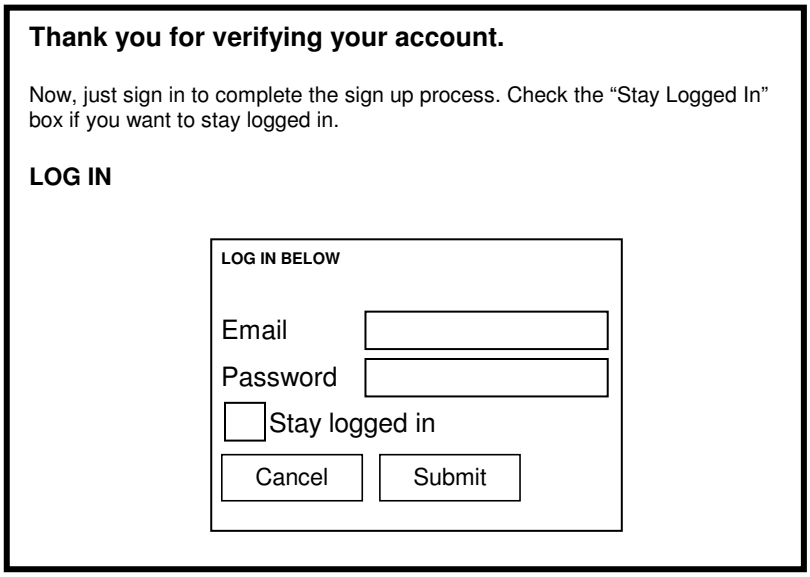
Thank you for verifying your account.
Now, just sign in to complete the sign up process. Check the "Stay Logged In" box if you want to stay logged in.
LOG IN
LOG IN BELOW
Email
Password
Stay logged in
Cancel
Submit

Figure 3: From Confirmation Link to Login

5. Log In to your account.
6. On the Home page, select on Monitors. Then, select Add Monitor. Enter the requested information.

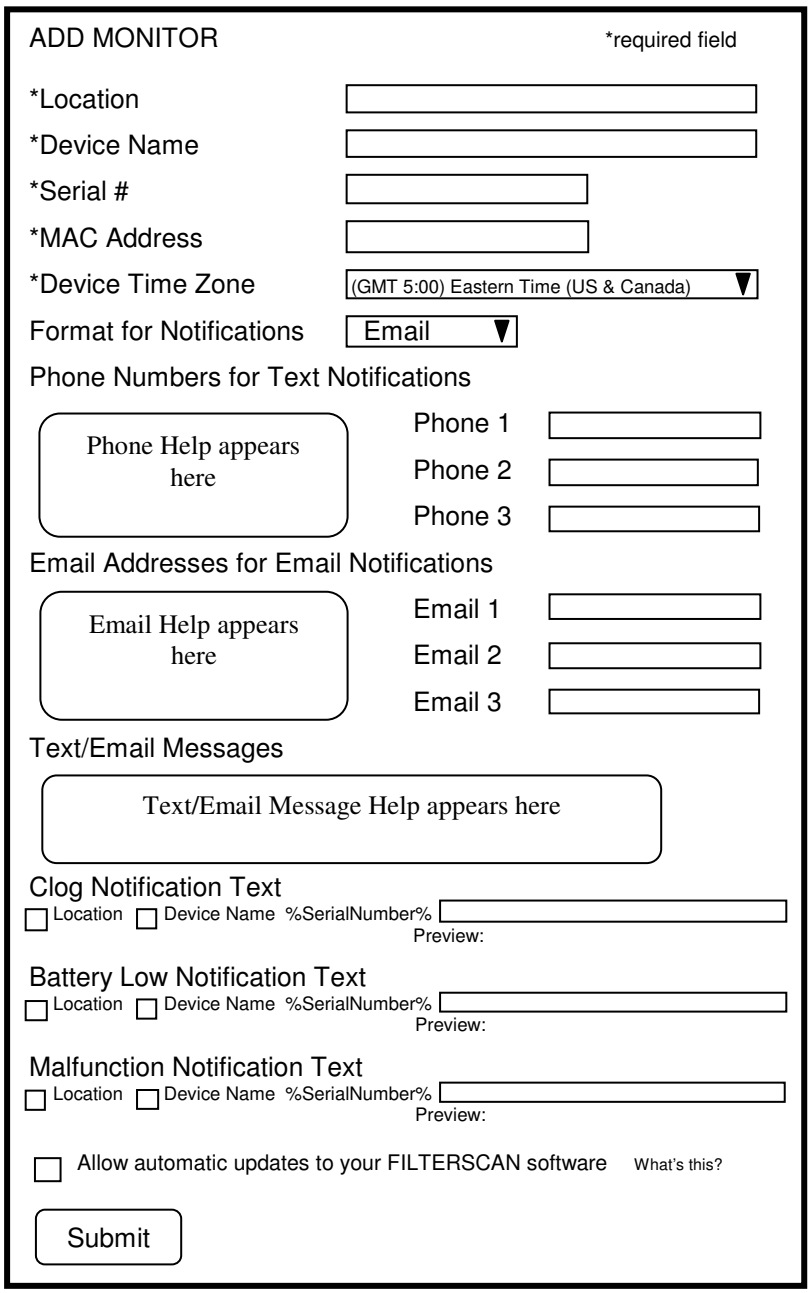

Figure 4: Enter Monitor Information

a. You must name the Location – use a name or phrase that helps you identify where the **FILTERSCAN *WiFi* Air Filter Monitor** is located (attic, basement, crawl space, etc.).
b. You must also name the Device – a name or phrase that whatever helps you identify the **FILTERSCAN *WiFi* Air Filter Monitor** (home, beach house, Apt #37, etc.).
c. Enter the Monitor's Serial Number and MAC address, including the "**:**" between character pairs. Both S/N and MAC were recorded previously in this manual, located on the back of the monitor, and located on the side of the Monitor box.
d. Select the Time Zone where the Monitor is located.
e. Select how you want to be notified: Email, Text, or Both.
f. Enter the smartphone number (up to 3) where you wish to receive text messages.
g. Enter the email address (up to 3) where you wish to receive email messages.
h. Enter the text and email messages you wish to receive.

i. Check the Location and or the Device Name check boxes to automatically add those to the alert messages you select. The “Preview” shows you how the text and or email will appear.
j. Check the “Allow automatic updates to your FILTERSCAN software” box if you want to receive automatic software updates. This remote update feature is transparent to you and no action is required after updates are installed.
k. Click on Submit. This will send you to the Contact page.

7. Enter Contact Information.

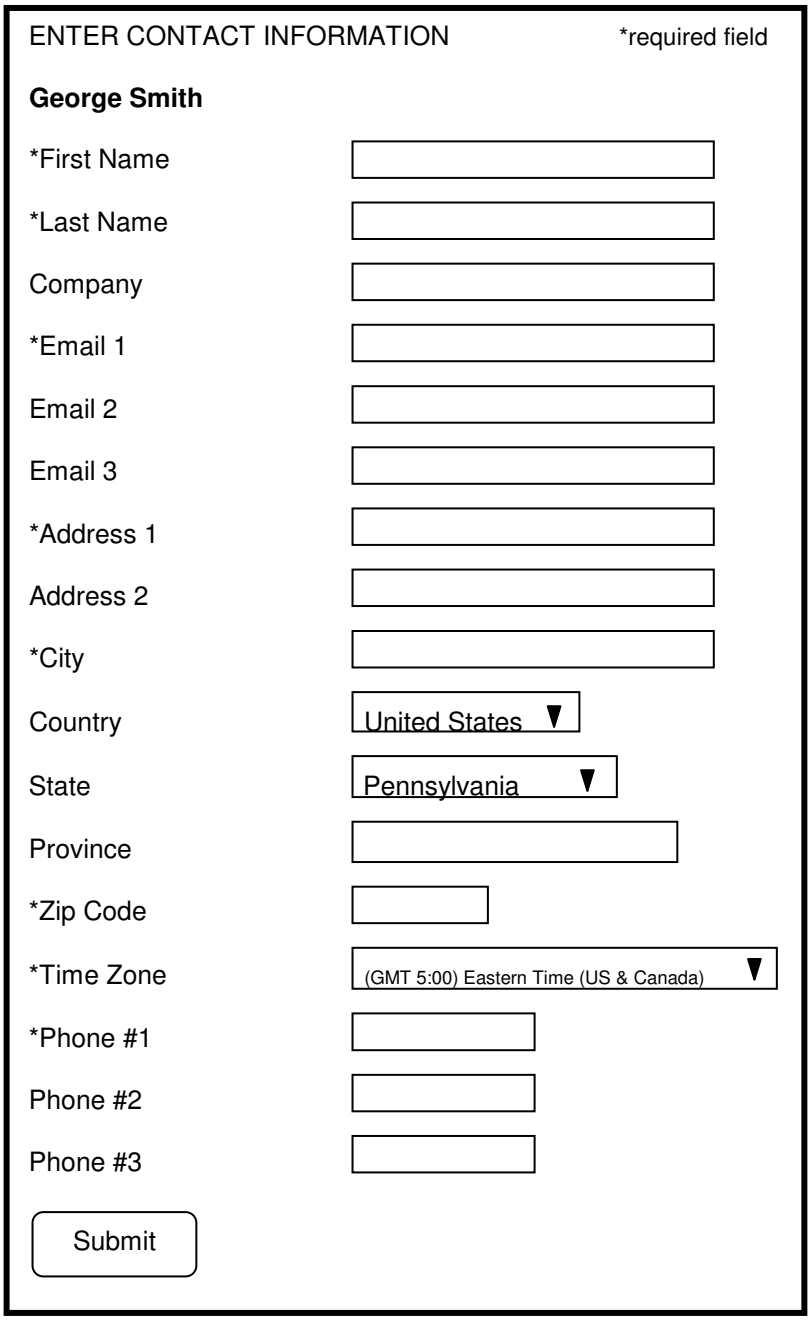

Figure 5: Contact Information

8. Enter Billing information – [NOTE: This will appear differently depending on account types].

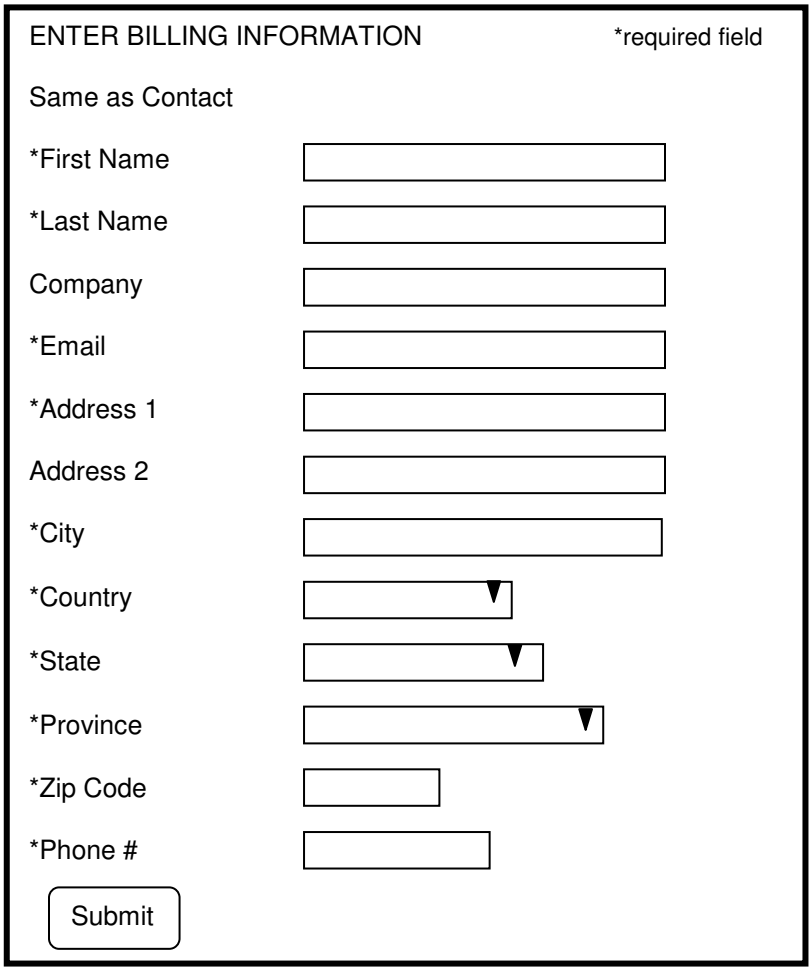

Figure 6: Billing Information

9. Click on Submit.
10. Enter credit card information on the payment page.
    NOTE: This will appear differently depending on payment types.
11. After payment is accepted, you will be directed back to the Home page.
    NOTE: Credit card acceptance and AFS database update may take a few minutes to complete. Please wait a few minutes before taking further action with your AFS account.

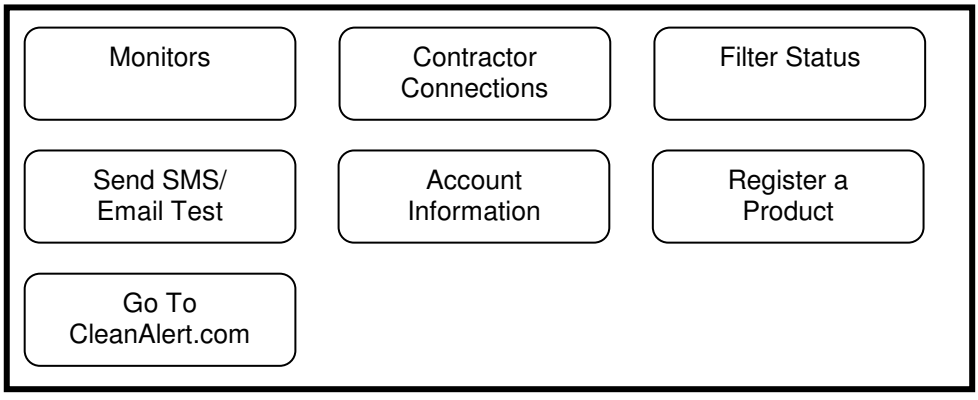

Figure 7: AirFilterSentry User Home Page

12. If you have another Monitor to sign up (Home+ and Manager accounts only), Log out and Log in. Select “Monitors” from the Home Page, then select “Add Monitor”.
13. Go to Step 6 to sign up additional monitors.
14. If you need to change any information you’ve entered for any monitor, click on “Edit Monitor” on the Home page.
15. Make the necessary changes and click on Submit.
16. Once all of your Monitors have been signed up, proceed to installation and connecting to your *WiFi* router, after which you may begin viewing the online status reports available at www.cleanalertwifi.com.

NOTE: *If you will be using a corporate network to connect the monitor to the Internet, contact your network administrator prior to enabling the web server of CleanAlert. Company policy may prohibit the use of web servers for security reasons. CleanAlert is not responsible for the use of, nor makes any claims as to the security of the web server interface over your network. The use of the web server is the responsibility of the end user.*

FILTERSCAN *WiFi* Air Filter Monitor Installation

The CleanAlert **FILTERSCAN *WiFi* Air Filter Monitor**, Model FS-245, **MUST** be installed at the RETURN side plenum, NOT the SUPPLY side (see the Appendix) either upstream of, downstream of, or differentially across the air filter (using the optional tubing kit Model CA-4DP). The Monitor must be mounted downstream if the VAV system is set to the constant torque mode.

To help determine which installation position is possible with your HVAC system, refer to Figures 16 through 20, which illustrate various installation configurations, as well as the proper setting of the Upstream/Downstream switch.

WARNING! **Ensure that the HVAC system blower motor/fan is OFF until told otherwise!**

WARNING! **Do NOT insert anything into the Sensor Tube! Doing so will result in sensor damage and malfunction.**

1. Insure you have recorded the Serial Number(s) and MAC address(es) previously in this document.
2. The **FILTERSCAN *WiFi* Air Filter Monitor** should be attached to the external wall of the return air duct or plenum, either upstream or downstream from the air filter, and at least six inches from the filter or any other obstructions within the duct or plenum.
3. Locate an area on the return, preferably downstream from the air filter (that is, between the air filter and the HVAC system blower), large enough to place the Monitor template on a flat surface and where there are NO obstacles inside the duct or plenum. There should be sufficient clearance (6” minimum) from the surrounding walls and from any components within the HVAC system. If there is an obstruction such that the Monitor cannot be installed as described above, you may need to complete the installation using the optional CA-4DP Tubing Kit.
4. Tape the Monitor template at the location found in the previous step, such that "TOP" is facing upward. The **FILTERSCAN *WiFi* Air Filter Monitor** front panel must be clearly visible when installed.
5. Using the template, Drill one 3/8” hole for the sensor.
6. **For sheet metal plenum installation**, drill four small holes (7/64") for the mounting screws provided.
   a. Attach the **FILTERSCAN *WiFi* Air Filter Monitor** by aligning its sensor tube with the larger hole and secure the Housing using the mounting screws supplied. The sensor tube does not extend into the duct.
7. **For Duct Board plenum installation**, follow the directions below. Otherwise go to Step 8.

a. Obtain Toggle Bolts (available at Home Depot)
   (1) #1/8" x 2" SKU 261181 Package of 25 or
   (2) #1/8" x 3" SKU 261203 Package of 25
b. Use toggle bolts that are one inch longer than the thickness of the duct board to allow the toggle to expand after inserting through mounting hole.
c. Drill 3/8" holes at the four **FILTERSCAN *WiFi* Air Filter Monitor** mounting hole locations (see Drill Template) as well as the Sensor Tube location.
d. Insert the bolt alone through the **FILTERSCAN** housing from the inside. Once through the housing, screw on the toggle a few threads such that the fins fold toward the housing. Do this for all four mounting holes.
e. Apply silicone sealant or air duct sealer to the inner sides of the toggle (see below) such that when the toggle expands inside the duct, the silicone will seal the hole and secure the toggle to the inside of the duct to help prevent the toggle from dropping into the duct if the screw is removed at a later date after the sealant has cured.

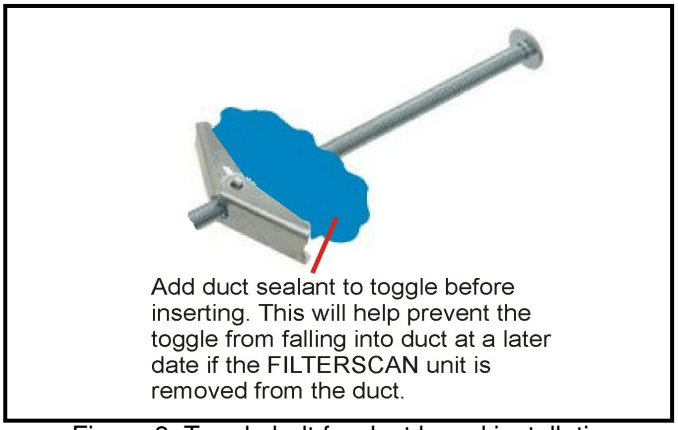
Add duct sealant to toggle before inserting. This will help prevent the toggle from falling into duct at a later date if the FILTERSCAN unit is removed from the duct.

Figure 8: Toggle bolt for duct board installation

f. Insert each toggle through the duct board holes, insuring the Sensor Tube aligns with the Sensor Tube hole.
g. Once all four toggles are fully inserted through the duct board, lightly pull the housing away from the duct board while tightening each bolt, until all four are securely fastened, without crushing the duct board. Make sure the Sensor Tube seal has been squeezed between the housing and duct board to insure no air leakage.

Figure 9: Side view of FILTERSCAN *WiFi* monitor

8. **IMPORTANT!** Set the Upstream/Downstream switch shown in Figure 10 so that it matches the **FILTERSCAN *WiFi*** Air Filter Monitor's position with respect to the air filter (that is, OFF for upstream mounting or ON for downstream or differential mounting). Please see the APPENDIX for 'Various HVAC Configurations for Monitor Installation' configurations.

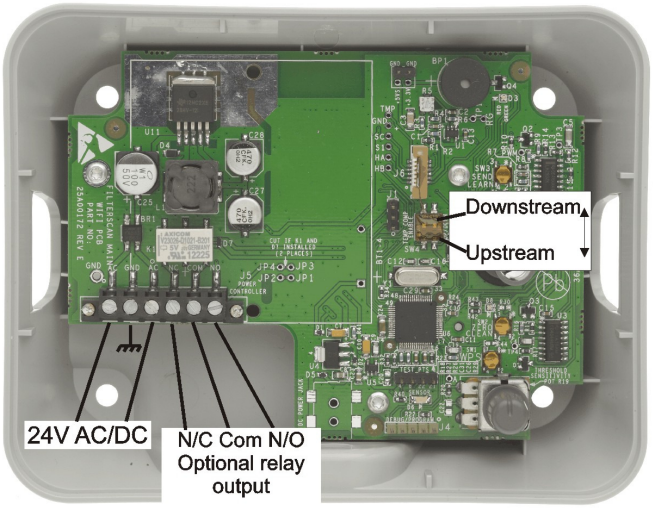

Figure 10: Inside of the FS-245-C FILTERSCAN *WiFi* monitor

Applying Power – Model FS-245-C (15-24V AC/DC)

SAFETY **This model product should only be installed by a licensed electrician.**

1. This model is powered from the HVAC system's auxiliary 15 to 24 VAC/DC power supply and should be installed by a qualified electrician. A typical installation will have that power run through an installer-provided conduit to the **FILTERSCAN *WiFi* Air Filter Monitor**.
2. Locate the six terminals on the left-hand bottom corner of the printed circuit board illustrated in Figure10. Connect 15 to 24V AC or DC to the 1st and 3rd leftmost terminals as shown. The 2nd leftmost terminal is for earth ground connection, if available.
3. The three terminals on the rightmost terminals are for connecting the optional dry contact relay output. Reference Figure 21 in the APPENDIX.
4. When power is applied, the beeper should sound momentarily and the **STATUS** LED should come on green momentarily, then turn on and remain red. This indicates that the unit has not yet been calibrated to the air filter and HVAC system upon which it is installed. Additionally, the *WiFi* Status LED will blink a series of Red and Green. Wait until all blinking has stopped.
5. Go to Section **Connect to a Wireless Router.**

Applying Power – Model FS-245-B (Battery/Adapter)

1. This model is powered from either four AA batteries or an optional wall mount power adapter. If the adapter is installed, the batteries may remain in place or be removed. Insert four (4) AA batteries in the battery holder**,** making sure the positive and negative directions are exactly as illustrated in Figure 11. CleanAlert recommends using **Energizer® ULTIMATE LITHIUM** batteries. See section "Operation - **FILTERSCAN *WiFi*** Air Filter Monitor" for battery replacement.
2. When power is applied, the beeper should sound momentarily and the **STATUS** LED should come on green momentarily, then turn on and remain red. This indicates that the unit has not yet been calibrated to the air filter and HVAC system upon which it is installed. Additionally, the *WiFi* Status LED will blink a series of Red and Green. Wait until all blinking has stopped.
3. Battery life is approximately one year when utilizing the Energizer ULTIMATE LITHIUM batteries. The use of other batteries, such as Alkaline, will significantly decrease battery life.

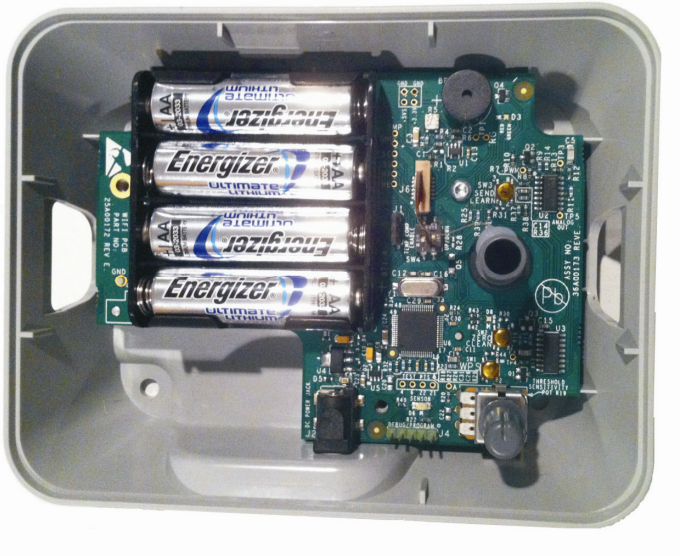

Figure 11: Inside the FS-245-B Monitor

Connect to a Wireless Router

Determine whether your router has a WPS button and where it is located. See page 14 if your router does not have a WPS button.

You are now ready to initiate communications between your **FILTERSCAN *WiFi* Air Filter Monitor** through your LAN (Local Area Network) via your wireless router to the **AirFilterSentry Notification Service server.** You must Sign Up to create an account on the **AirFilterSentry Notification Service** server prior to performing the following.

Connect to a Wireless Router "With" a WPS Button

1. Depress the WPS button on your router for two to ten seconds until its *WiFi* LED begins to blink. See your router user's manual if you do not know what that button looks like. Timing varies with router manufacturers.
2. Reference Figure 12 to locate the **FILTERSCAN *WiFi* Air Filter Monitor** WPS button.
3. Within several seconds (time depends on your specific wireless router), using a nonmetallic instrument such as a pencil eraser, toothpick, or other non-metallic object, depress the WPS button just once until you feel a click and immediately release. A series of red, green, and amber *WiFi* Status Indicator flashes will occur, and finally go out. If a series of red *WiFi* Status LED flashes occur at the end of the flashes, refer to Table 1 *WiFi* Status Indications for further steps.
4. Your **FILTERSCAN *WiFi* Air Filter Monitor** is now connected to your wireless router, and has initiated a connection process where the **FILTERSCAN *WiFi* Air Filter Monitor** and your wireless router communicate with each other and establish a connection with no further action needed.

   NOTE: *If you will be using a corporate network to connect the monitor to the Internet, contact your network administrator prior to enabling the web server of CleanAlert. Company policy may prohibit the use of web servers for security reasons. CleanAlert is not responsible for the use of, nor makes any claims as to the security of the web server interface over your network. The use of the web server is the responsibility of the end user.*

5. Go to "**Connect to the AirFilterSentry Notification System Server".** See page 15.

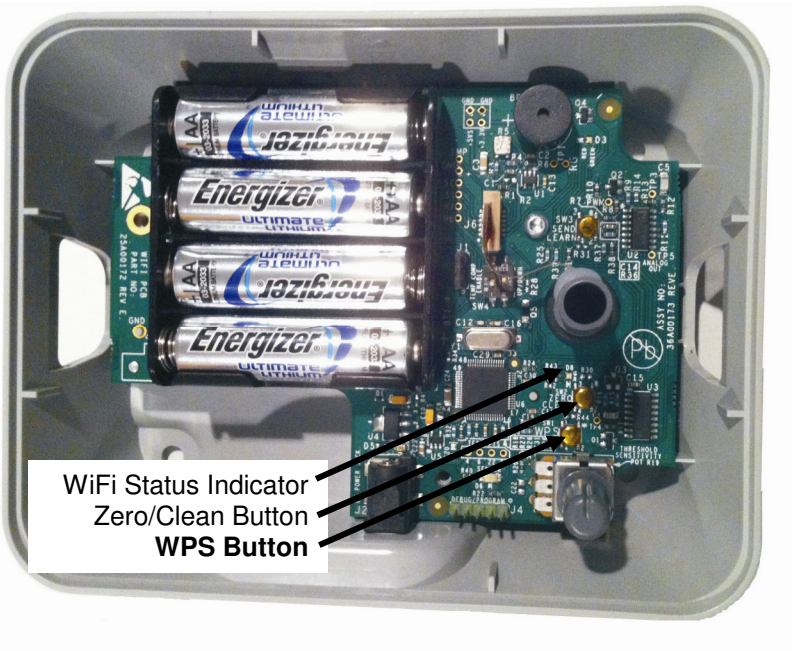

Figure 12: *WiFi* Status LED and WPS Button Locations

Table 1 *WiFi* Status indications (Locate the internal *WiFi* Status Indicator above. The Heartbeat and other normal, non-*WiFi* status indications which appear on the **STATUS** LED are shown elsewhere in this manual.)

***WiFi* Status**	**LED Blink Indication**	**Notes**
None	Normal operation	
Attempting connection to *WiFi* network	Continuous **slow** Yellow flashing	In process of connecting to the Access Point or Wireless Router after the **WPS** button is depressed
No WPS access point found	Flashes Red 4 times, pattern repeats 3 times.	Did not find the access point or wireless router (highest priority). Check to insure other devices (laptop or mobile device) can connect to your LAN
Error Connecting to *WiFi* network after Access Point configuration	Flashes Red 2 times, pattern repeats 3 times.	Check to insure other devices (laptop or mobile device) can connect to your LAN
Error Connecting to *WiFi* network	Flashes Red 3 Times, pattern repeats 3 times.	Check to insure other devices (PC, laptop or mobile device) can connect to your LAN
Error Connecting to the Cloud Server	Flashes Red 5 Times, pattern repeats 3 times.	Check to insure other devices (PC, laptop or mobile device) can access www.cleanalertwifi.com to test server operation
Message refused by the Cloud Server	Flashes Red 6 Times, pattern repeats 3 times.	MAC address not yet entered in the AFS database. Insure that you signed up your Monitor as directed in the AFS Notification Service User Configuration section earlier in this manual
In process of resetting	Continuous Fast Red	No action required

WiFi Status	LED Blink Indication	Notes
WiFi	Flashing	
WiFi set to factory defaults	Continuous slow Yellow flashing	Connect to FILTERSCAN *WiFi* network and configure the FilterScan device.
Downloading firmware update file	Continuous Fast Yellow Flashing	No action required
Connecting to server	Fast Green Flashing	No action required

Connect to a Wireless Router "Without" a WPS Button

Follow these steps if your wireless router **DOES NOT** have a WPS button. This is referred to **Ad Hoc Association.**

1. Items needed:
   a. A *WiFi*-enabled device with web browsing capabilities, such as a laptop, smartphone, or tablet
   b. The wireless password or passphrase for your router
   c. The SSID of your wireless router (look on the side or bottom of the router or consult its manual)
2. Reference Figure 12 to locate the **FILTERSCAN *WiFi* Air Filter Monitor** WPS button.
3. Depress and hold the **WPS** button until the *WiFi* Status Indicator blinks green then fast red. This may take up to 30 seconds. Release the button and wait until the WiFi Status Indicator blinks amber.
4. Using your *WiFi*-enabled device, connect to the "FILTERSCAN" network. On an iPhone or iPad you do this by going to the Settings app. It may take a few minutes for the FILTERSCAN network to appear.
5. Once the *WiFi*-enabled device is connected to the FILTERSCAN network, open a web browser on your *WiFi*-enabled device.
6. Enter the IP address **192.168.1.1** in the URL box

Figure 13: FILTERSCAN *WiFi* Network Configuration Page

7. Wait for the page to update and show the available networks. You are looking for the SSID of your router. This may take several minutes. If the expected network is not available, press the "Refresh" button.

Figure 14: FILTERSCAN *WiFi* Network Configuration Page

8. Enter your router's password and press the Join Network button.

   Supported network types for ad hoc association:

   - WEP128
   - WPA-PSK (TKIP)
   - WPA2-PSK (AES)
   - WPA-PSK mixed mode (some access points, not all are supported)

For WEP networks, the security key entered is the hexadecimal key, not the passphrase used to generate the key. WEP128 keys must be 26 digits long consisting of characters 0-9 and A-F.

The **FILTERSCAN *WiFi* Air Filter Monitor** *does not support spaces in the WPA or WPA2 passphrases.*

9. Your **FILTERSCAN *WiFi* Air Filter Monitor** is now connected to your wireless router, and has initiated a connection process where the **FILTERSCAN *WiFi* Air Filter Monitor** and your wireless router communicate with each other and establish a connection with no further action needed.

   NOTE: *If you will be using a corporate network to connect the monitor to the Internet, contact your network administrator prior to enabling the web server of CleanAlert. Company policy may prohibit the use of web servers for security reasons. CleanAlert is not responsible for the use of, nor makes any claims as to the security of the web server interface over your network. The use of the web server is the responsibility of the end user.*

Connect to the AirFilterSentry Notification System Server

1. Upon successful sign up, subscription, configuration, installation, power up, and Internet connection, the **FILTERSCAN *WiFi* Air Filter Monitor** will be connected to the **AirFilterSentry Notification System** server through your wireless router and should require no further attention. The Monitor will start sending status messages to the server on a periodic basis.
2. To test the Internet connection:
   a. Although the wireless transmission range should cover your building, it is greatest with minimum obstructions between the **FILTERSCAN *WiFi* Air Filter Monitor** and the wireless router. Any obstructions, such as walls, floors, and ceilings can reduce the range of transmission, and relocation of the wireless router may be required. Retest with each location to ensure proper operation.
   b. Depress the **SEND** button of the **FILTERSCAN *WiFi* Air Filter Monitor** once at any time to send its status to the **AirFilterSentry Notification Service** server database.
   c. Then, login to your account* at www.cleanalertwifi.com to view your monitor's status.

NOTE: Your **FILTERSCAN *WiFi* Air Filter Monitor** status display at the **AirFilterSentry Notification Service** is capable of displaying more than 100% clogged. This is possible since the "100% clogged" point is the recommended point when it is most efficient to service (replace or clean) the air filter. If you ignore the notification and continue to operate your HVAC system, the air filter will become dirtier and the status will rise above 100% clogged. To provide the most efficient air filtration and HVAC system operation, you should service the air filter as soon as possible after being notified of a clogged condition.

**Subscription to the AirFilterSentry Notification service is required to enable this feature*

Calibrating the FILTERSCAN *WiFi* Air Filter Monitor

FILTERSCAN® WiFi Air Filter Monitor
CleanAlert
Air System Efficiency Monitors
When Changing the Air Filter
1- Turn system OFF at thermostat
2- Install new air filter
3- Press Zero/Clean button
4- Wait for Red Status
5- Press Zero/Clean button
6- Wait for Status to change from Yellow to Green
7- Turn system ON at thermostat
8- Increase or decrease temperature setting to turn fan ON
9- Wait one minute
10- Press Zero/Clean button
11- Wait for Status to change from Yellow to Green
12- Wait for Green Status to turn OFF
13- Return system to normal temperature setting
CleanAlert products are manufactured under one or more of the following U.S. patents: 7,178,410 & 7,490,512
Contains FCC ID #T9J-RN171 and IC ID #6514A-RN171
Status
Send
Zero/Clean
recommended setting
less often
more often
Service Filter

Figure 15: Front cover of the FILTERSCAN *WiFi* monitor

1. After power is applied, wait for approximately 15 seconds (warm up and stabilization time).
2. Turn the HVAC system OFF at the thermostat. Ensure the HVAC system blower is turned OFF and that no conditions exist during this part of the calibration that would cause air to be moving within the HVAC ducts, such as opening and closing of doors or windows.
3. Install a clean, new air filter into the system.
4. Depress the **ZERO/CLEAN** button ONCE.
5. If the **STATUS** LED turns Red, depress the **ZERO/CLEAN** button ONCE again.
   a. The **STATUS** LED will blink yellow for several seconds while the **FILTERSCAN *WiFi* Air Filter Monitor** records the HVAC system's FAN OFF condition, then turns to blinking green. This indicates proper operation and that you are ready to move to next step. If the unit detects the zero air flow is out of limits, the **STATUS** LED will blink red. In this case, check to see that the system blower fan is OFF and that no condition described in step 1 exists. If no such condition exists, start again at step 1. If the error condition persists, call 888-414-FLOW (3569) for instructions.
6. Adjust the thermostat temperature adjustment to either increase or decrease the room temperature by at least ten degrees, enough to signal the HVAC system to turn on heating or cooling at maximum blower fan speed.
7. Once the HVAC system blower fan turns on, wait at least one minute, or until the blower fan reaches maximum speed, for the blower fan to stabilize. This is critical to proper operation in VAV blower systems.
8. Depress the **ZERO/CLEAN** button once. The **STATUS** LED should turn from blinking green to blinking yellow for about eight (8) minutes. This indicates that the unit is calibrating itself to the air filter and HVAC system into which it is installed.
9. Once calibration is completed, the **STATUS** LED will change from blinking yellow to blink green a few times then turn off.
10. Return the thermostat to normal operating temperature.

This concludes the installation of the **FILTERSCAN *WiFi* Air Filter Monitor**.

The **SERVICE FILTER** control is a fine tuning adjustment that has been calibrated during production to the mid-range, which is the Recommended Setting. This control allows the user to change the point at which the clog alarm will be triggered. Turning the **SERVICE FILTER** adjustment knob clockwise will cause the **FILTERSCAN *WiFi* Air Filter Monitor** to issue an alarm at a lower level of filter clogging (less energy consumption). Turning the **SERVICE FILTER** adjustment knob counter-clockwise will cause the **FILTERSCAN *WiFi* Air Filter Monitor** to issue an alarm at a higher level of filter clogging (more energy consumption). See the FAQ Section for further information.

Operation - FILTERSCAN *WiFi* Air Filter Monitor

System Monitoring

The **STATUS** LED will blink green approximately once per minute (called a heartbeat) to indicate that the unit is functioning properly. Usually the **FILTERSCAN *WiFi* Air Filter Monitor** will be in the standby mode, conserving power. It wakes up periodically to monitor air filter condition, battery level, and system operation. If no alarm conditions are detected, the **FILTERSCAN *WiFi* Air Filter Monitor** goes back to sleep after several minutes of monitoring.

NOTE: Should there be a power failure the **FILTERSCAN *WiFi* Air Filter Monitor** will save all parameters such as the clean air filter calibration and the current state of the air filter. When power is restored, the **FILTERSCAN *WiFi* Air Filter Monitor** will continue operation with no user action required. The same applies when replacing depleted batteries.

Alarm Modes

The **FILTERSCAN *WiFi* Air Filter Monitor** provides both audible and visual local alarms indicating a clogged air filter, a low battery, or a system malfunction. In addition, the **AirFilterSentry** Notification Service allows remote monitoring* of system conditions. **Subscription to the AirFilterSentry Notification service is required to enable this feature.*

NOTE: The HVAC system blower fan must be running when the **FILTERSCAN *WiFi* Air Filter Monitor** attempts to check air filter condition. Since the **FILTERSCAN *WiFi* Air Filter Monitor** checks the air filter condition periodically, it may take several days to detect, trigger, and alert a clogged filter condition.

NOTE: The **FILTERSCAN *WiFi* Air Filter Monitor** has a light sensor which prevents audible alarms when there is no light present at the Monitor location. This prevents awaking occupants while sleeping and prevents needless beeping in a crawl space, attic, or other unoccupied location. The visual Status LED will still operate normally regardless of lighting conditions.

Clogged Air Filter

When the **FILTERSCAN *WiFi* Air Filter Monitor** detects a clogged air filter, an alert condition is triggered. The red **STATUS** LED will illuminate, blinking five times approximately every ten minutes until the alert condition is reset. There will also be an audio alert which corresponds to the visual alert indication. The clogged filter alert is reset by following the instructions in the section "Calibrating When Installing a New Air Filter" below. In addition, a text and or email will be sent to a designated person if you have signed up for the **AirFilterSentry** Notification Service.

NOTE: A new or cleaned air filter should always be installed whenever the CALIBRATE operation is performed.

Low Battery

When the **FILTERSCAN *WiFi* Air Filter Monitor** detects a low battery condition, an alert condition is triggered. The **STATUS** LED will blink yellow approximately once per minute to indicate a low battery in the Monitor. Replacing the Monitor batteries (see APPENDIX) will reset the alert condition. In addition, a text and or email will be sent to a designated person if you have signed up for the **AirFilterSentry** Notification Service.

Battery Replacement

Access: Remove the front cover from the **FILTERSCAN *WiFi* Air Filter Monitor** housing. Remove the batteries.

Installation: Insert four (4) **Energizer® ULTIMATE LITHIUM** batteries in the battery holder of the **FILTERSCAN *WiFi* Air Filter Monitor,** observing polarity, and replace the front cover.

Malfunction

When the **FILTERSCAN *WiFi* Air Filter Monitor** detects an internal malfunction, an alert condition is triggered. The red **STATUS** LED will illuminate continuously until the malfunction is corrected. In addition, a text and or email will be sent* to a designated person if you have signed up for the **AirFilterSentry** Notification Service. In the unlikely event this should occur, remove power from the **FILTERSCAN *WiFi* Air Filter Monitor** by removing the batteries, unplugging the optional AC Adapter, or in the case of 15-24V AC/DC-powered models ("-C") contacting your HVAC system electrician to have the power to the Monitor turned off. Wait for a minute and restore power. If your **FILTERSCAN *WiFi* Air Filter Monitor** unit is operating with both AC Adapter and batteries installed, both will need to be removed in order to reset the malfunction. If this does not reset the malfunction alert, call 888-414-FLOW (3569) for instructions.

Calibrating When Installing a New Air Filter

Whenever a new air filter is installed, the **FILTERSCAN *WiFi* Air Filter Monitor** must be calibrated. Calibration establishes the clogged air filter detection threshold based upon the condition recorded for a new air filter. When a new air filter is installed, its condition is recorded and saved in nonvolatile memory. Reference the instructions on the monitor cover.

1. Ensure that the HVAC system is **OFF** at the thermostat.
2. Remove the dirty air filter from the HVAC system.
3. Install a new, clean air filter into the HVAC system.
4. Make sure the **FILTERSCAN *WiFi* Air Filter Monitor** power is ON and the low battery indication is not being displayed.
5. Depress the **ZERO/CLEAN** button on the **FILTERSCAN *WiFi* Air Filter Monitor**.
6. Wait for the red **STATUS** LED to illuminate.
7. Depress the **ZERO/CLEAN** button again.
8. Wait several seconds for the **STATUS** LED to change from blinking yellow to blinking green.
9. Turn the HVAC system ON at the system thermostat.
10. Set the thermostat temperature adjustment to either increase or decrease the room temperature by ten degrees, which should be enough to signal the HVAC system to turn heating or cooling on.
11. Wait one minute for the HVAC system blower fan to turn on and stabilize. (*For VAV blower systems, it may take a few minutes for the blower fan to reach maximum speed.)*
12. Depress the **ZERO/CLEAN** button again.
13. Wait approximately eight (8) minutes for the **STATUS** LED to turn from blinking yellow to blinking green. During this time, the unit is recording the condition of the clean air filter.
14. Wait several seconds for the blinking green **STATUS** LED to turn OFF.
15. Return the thermostat to normal operating temperature.

Your **FILTERSCAN *WiFi* Air Filter Monitor** is now calibrated to the type of air filter you have installed. Depending on the air filter type and

manufacturing tolerances, you may need to calibrate the **FILTERSCAN *WiFi* Air Filter Monitor** each time a new air filter is installed.

Automatic Adjustment

ATTENTION - HVAC systems with two-speed blowers! Typical HVAC systems will have different blower speeds for Heat and A/C. The **FILTERSCAN *WiFi* Air Filter Monitor** automatically adapts to the changes in HVAC blower speeds.

Software Updates

The **FILTERSCAN *WiFi* Air Filter Monitor** has the capability of automatically updating its software through its Internet connection to the AirFilterSentry cloud server. If you checked the "Allow Automatic Updates to your **FILTERSCAN** Software?" box on the Edit Monitor screen and there is a later version of software available on the server, your **FILTERSCAN *WiFi* Air Filter Monitor** will automatically download the latest version of software and update itself without any action by you. The update will be transparent and all operating parameters will be intact after the update.

Frequently Asked Questions

All Models

Can the **FILTERSCAN *WiFi* Air Filter Monitor** be mounted on the supply side of the HVAC blower?

No, only on the return side duct, either upstream or downstream of the air filter or differentially across the air filter.

Can I install the **FILTERSCAN *WiFi* Air Filter Monitor** on a multi-speed blower HVAC system?

Yes.

Can I install the **FILTERSCAN *WiFi* Air Filter Monitor** on a Variable Air Volume (VAV) HVAC system?

As of the writing of this manual, the **FILTERSCAN WiFi Air Filter Monitor** *will operate with most VAV systems in production.* Note: The Monitor must be mounted downstream if the VAV system is set to the constant torque mode.

What effect, if any, does opening or closing air vent registers have on the **FILTERSCAN *WiFi* Air Filter Monitor** performance after it has been calibrated to a new air filter?

Any significant changes in HVAC system pressure caused by register changes or other factors will change the point at which the clog alert will occur. The greater the number of system registers, the less effect on the system's pressure when one or two registers are changed and therefore the less effect on when the clog alert will occur. Regular changes to system registers could make the performance unpredictable.

What if my **FILTERSCAN *WiFi* Air Filter Monitor** stops sending status data? What if the Status report at my AirFilterSentry Notification Service account does not display a recent update Date?

There could be many causes for data to not reach the AFS server.

1. *First, depress the* ***SEND*** *button on the* **FILTERSCAN *WiFi* Air Filter Monitor** *front panel. Wait for one minute then recheck the AFS Status Display for a current update time and date.*

2. *Next, check the* **FILTERSCAN *WiFi* Air Filter Monitor** *power. Insure batteries or power to the Monitor is good (Status LED blinks green approximately once per minute).*
3. *Turn power off to the* **FILTERSCAN *WiFi* Air Filter Monitor** *power for one minute. Then turn power back on.*
4. *Turn power off to your wireless router for one minute. Then turn power back on.*
5. *View your* **AirFilterSentry Notification Service** *subscription as it may have expired.*

If none of the above result in updated status data, please review **Table 1 *WiFi* Status indications** *above for various WiFi Status LED conditions.*

Can I install the **FILTERSCAN *WiFi* Air Filter Monitor** on a multi-speed blower HVAC system?

Yes.

Where should I set the Service Filter knob?

At the recommended setting in the center of travel. This equates to the doubling of the initial differential pressure to cause a clog alert.

If you want to waste energy, or think your filter is not dirty enough when a clog alert occurs at the Recommended setting, you may turn the Service Filter knob CCW toward "Less Often". This increases the differential pressure needed to cause a clog alert. Results? A more dirty filter, more energy usage, and decreased IAQ.

If you want to save more energy at the expense of higher air filter costs, or think your filter is too dirty when a clog alert occurs at the Recommended setting, you may turn the Service Filter knob CW toward "More Often". This decreases the differential pressure needed to cause a clog alert. Results? A cleaner filter, higher air filter costs, less energy usage, and increased IAQ.

Overall, the Service Filter knob should be to set it at the Recommended setting for the best balance between wasted energy and higher air filter costs.

Model FS-245-C

How is the conduit mechanically connected to the **FILTERSCAN *WiFi* Air Filter Monitor**?

There is a conduit connector knock-out located on the lower side of the monitor housing.

What voltage is acceptable to power the **FILTERSCAN *WiFi* Air Filter Monitor** via the conduit?

Typically 24V AC/DC, although an input voltage as low as 15V DC is acceptable.

Model FS-245-B

Do I have to install batteries if I power the Monitor from the optional AC Adapter?

No.

Can I utilize both the AC Adapter and batteries for backup?

Yes, you can install batteries even though you also have an AC adapter installed. Such power backup is unnecessary however because the monitor's non-volatile memory stores all operating parameters in the event of a power failure.

Wireless Router

What should I do if I am unable to connect my monitor to my wireless router?

Determine whether your routers wireless security has either not been set or set to WPA-PSK (TKIP) or WPA2-PSK (AES). To do this, you will need to consult your routers manual. If your routers wireless security has been set to any other method, you will need to change it to WPA-PSK (TKIP) or WPA2-PSK (AES).

How far can the **FILTERSCAN *WiFi* Air Filter Monitor** be mounted from the wireless router?

The range of the WiFi signal is similar to the range of your wireless devices (laptop, smartphone, etc.). However, obstacles such as walls between the Router and Monitor could decrease the effective range of the device.

Multiple Monitors

What if my building has multiple HVAC systems, each with their own **FILTERSCAN *WiFi* Air Filter Monitor.** Will the **AirFilterSentry** Notification Service allow access of all Monitors within one account?

Yes, the number of monitors though depends upon the type of subscription you've purchased.

Specifications

Pressure Differential Range	0.1 to 4.0 in H_2O
Clog Filter Trigger Point	1.5 to 2 times initial differential pressure (at the recommended setting on the **SERVICE FILTER** control)
Temperature Range	32° to +122° F (0° to +50° C) Operating -40° to +185° F (-40° to + 85° C) Storage
Humidity	80% RH, non-condensing
Power Requirements (-B)	6.0 VDC at 90 mA Transmitting, <20 uA Standby
Batteries, Monitor (-B)	(4) AA 2400 mAH
Battery Life	Approximately 1 year
Power Requirements (-C)	15 to 24 VAC/DC at 11 mA Transmitting, <20 mA Standby
Insertion Depth into Duct	Does not extend into duct
Clogged Air Filter Alert	Red **STATUS** LED & 2 KHz Beeper alternating ON & OFF five times
Low Battery Alert	Yellow **STATUS** LED blinking approximately once per minute
Malfunction Alert	Red **STATUS** LED continuously illuminated
Mounting	5 holes, 4 @ 7/64" and 1 @ 3/8"
Monitor Dimensions	6" x 4.625" x 1.5"
WiFi Module	FCC/CE/IC certified 2.4-GHz IEEE 802.11b/g transceiver
WiFi Authentication	Secure using WPA2-PSK (AES)
Transmission Range	Within your building similar to other *WiFi* devices, depending upon line-of-sight and obstacles
FCC Identification #	Contains FCC ID Number: T9J-RN171
Industry Canada #	Contains IC Certification/Registration Number: #6514A-RN171

Warranty

Limited warranty Please refer to www.cleanalert.com/termsofsale.html for full warranty text.

For a period of one (1) year following the date of purchase of the Product, if the Product ceases to function and/or functions improperly due to a defect in material or workmanship, CleanAlert, LLC will repair or replace the Product (at its sole discretion) free of charge to the customer. This warranty does not apply to:

1. Damage caused by accident, abuse or mishandling of the Product after it has left CleanAlert, LLC's facility;
2. Acts of God;
3. Units which have been subject to unauthorized repair and/or have been taken apart or otherwise modified;
4. Units damaged from installation or use not in accordance with these instructions;
5. Damages exceeding the cost of the Product; and
6. Damages that are considered normal wear and tear (in CleanAlert, LLC's sole discretion).

A Product requiring warranty service shall be sent by the customer to CleanAlert's facility in West Chester, PA. This warranty does **NOT** cover the costs of having the Product transported to CleanAlert, LLC for warranty service. The customer is responsible for safely sending the Product to CleanAlert, LLC.

WiFi

Transmitter

The **FILTERSCAN *WiFi* Air Filter Monitor** contains a *WiFi* radio module operating at a frequency of 2.4GHz, which is activated periodically. Transmissions to the **AirFilterSentry Notification Service**, are very short in duration.

Each **FILTERSCAN *WiFi* Air Filter Monitor** has been assigned a unique MAC address at the time of manufacture.

Remote Update

The **FILTERSCAN *WiFi* Air Filter Monitor** has the ability to allow the **AirFilterSentry Notification Service** to update the Monitor software. During user configuration on the **AirFilterSentry Notification Service** website, if you checked the "Allow Automatic Updates to your **FILTERSCAN** Software?" box on the Edit Monitor screen and there is a later version of software available on the server, your **FILTERSCAN *WiFi* Air Filter Monitor** will automatically download the latest version of software and update itself without any action by you. The update will be transparent and all operating parameters will be intact after the update.

1. Software updates will be made available by the **AirFilterSentry Notification Service**.
2. When an update is made available, the Notification Service will send an update command to the **FILTERSCAN *WiFi* Air Filter Monitor** in response to the Monitor's periodic status message.
3. If you've elected to receive automatic updates, the Monitor then downloads and validates the new software.
4. No further action is required on your part.

Revision History

Rev. #	Effective	Summary:
3.00	12/19/14	Original Approved Release
3.03	1/23/15	Rearrange to best order of sign up and installation
3.04	2/5/15	Final Review for Publishing

Appendix

Glossary

HVAC …….....	Heating, ventilating, and air conditioning
Dirty Air Filter	An air filter which has been in use and has collected some amount of dirt or dust particles that discolor the filter fibers or element but do not substantially affect the air flow through it.
Clogged Air Filter	An air filter which has collected a sufficient amount of dirt or dust particles to not only discolor the filter fibers or element but decrease the air flow through the filter as well. The **FILTERSCAN *WiFi* Air Filter Monitor** typically identifies a filter as clogged when the differential pressure within an HVAC system increases to 1.5 to 2 times the initial differential pressure identified when the unit was calibrated with a clean filter.
Monitor	The sensor voltage detection and signal processing portion of the system.
AirFilterSentry.....	The application software and database residing on the Cloud Server that provides all operational aspects of the **AirFilterSentry Notification Service**.
Cloud Server.....	The computer server on which the **AirFilterSentry Notification Service** resides and operates. The hosting service ensures database backups and redundancy to provide maximum up-time of their systems.
MAC Address	Media Access Control unique identifier assigned to the *WiFi* radio within the **FILTERSCAN *WiFi* Air Filter Monitor**.

Indicators

Green **STATUS** LED.....	The blinking Green **STATUS** LED at the **FILTERSCAN *WiFi* Air Filter Monitor** indicates normal operation.
Yellow **STATUS** LED.....	The blinking Yellow **STATUS** LED at the **FILTERSCAN *WiFi* Air Filter Monitor** indicates a process is occurring and can also indicate a low battery condition at the Monitor or Receiver.
Red **STATUS** LED.....	The Red **STATUS** LED at the **FILTERSCAN *WiFi* Air Filter Monitor** is an alarm indicator which blinks whenever an alarm condition occurs.
Beeper.....	The audible beeper at the **FILTERSCAN *WiFi* Air Filter Monitor** is an alarm indicator which beeps whenever certain alarm conditions occur.

Local Alarm Indications

Monitor/Transmitter Alarm Indications

Alarm Condition	Alarm Indication	Clear Alarm Procedure
Normal Operation	**STATUS** LED flashes green every minute.	None
Clogged Filter	**STATUS** LED flashes red five times every ten minutes. Beeper sounds with LED flash.	Replace Filter and Recalibrate
Low Battery	**STATUS** LED flashes yellow every minute.	Replace Batteries
Sensor Failure	**STATUS** LED continuously on red.	Contact CleanAlert at 888-414-3569

Various HVAC Configurations for Monitor Installation

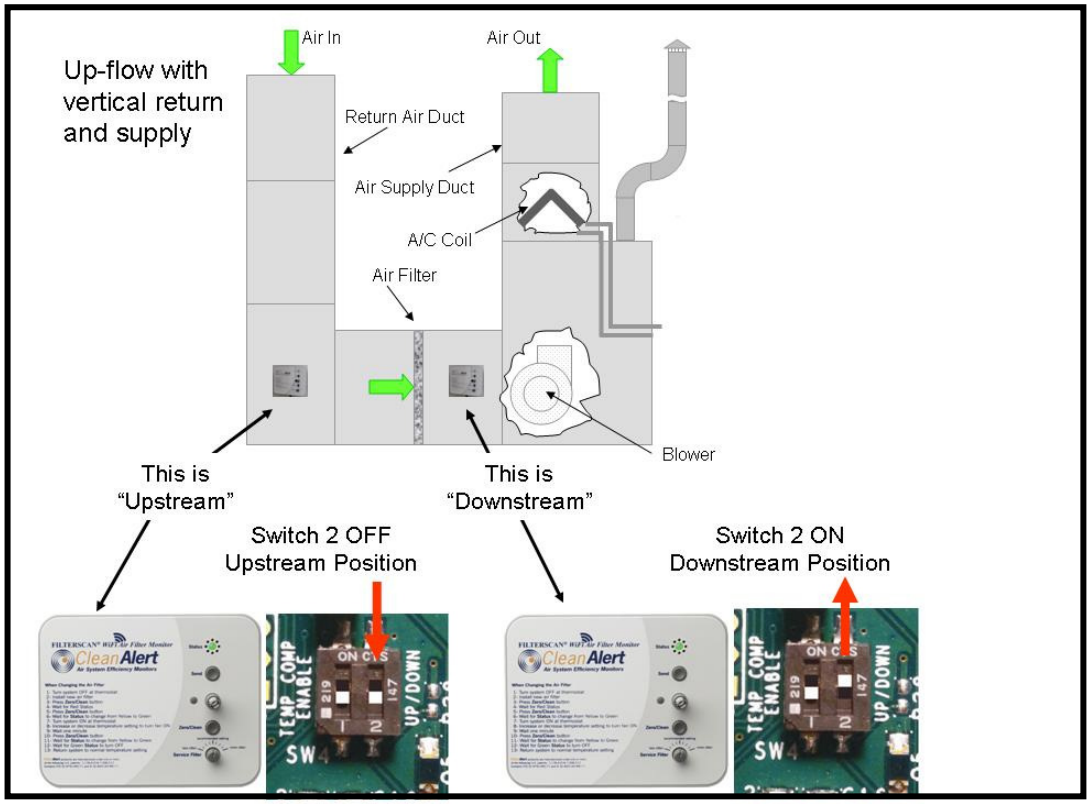

Figure 16: Installation on HVAC systems with vertical return and supply ducts

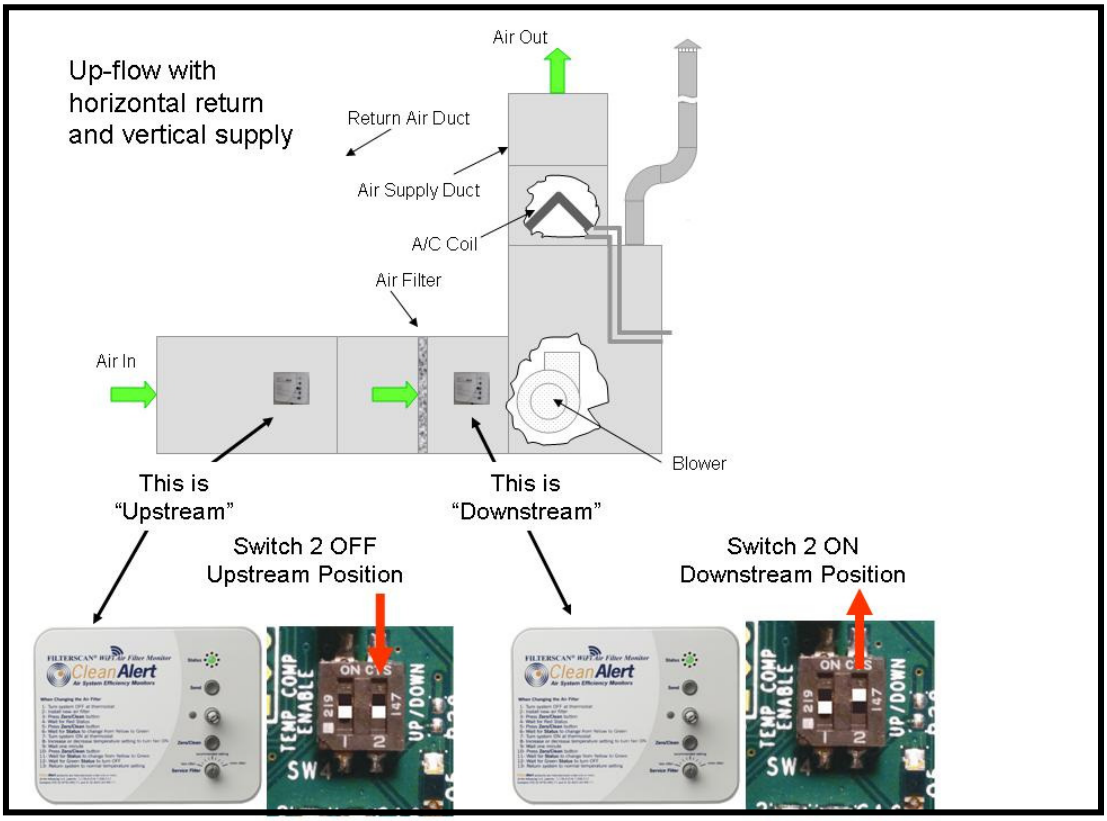

Figure 17: Installation on HVAC systems with horizontal return and vertical supply ducts

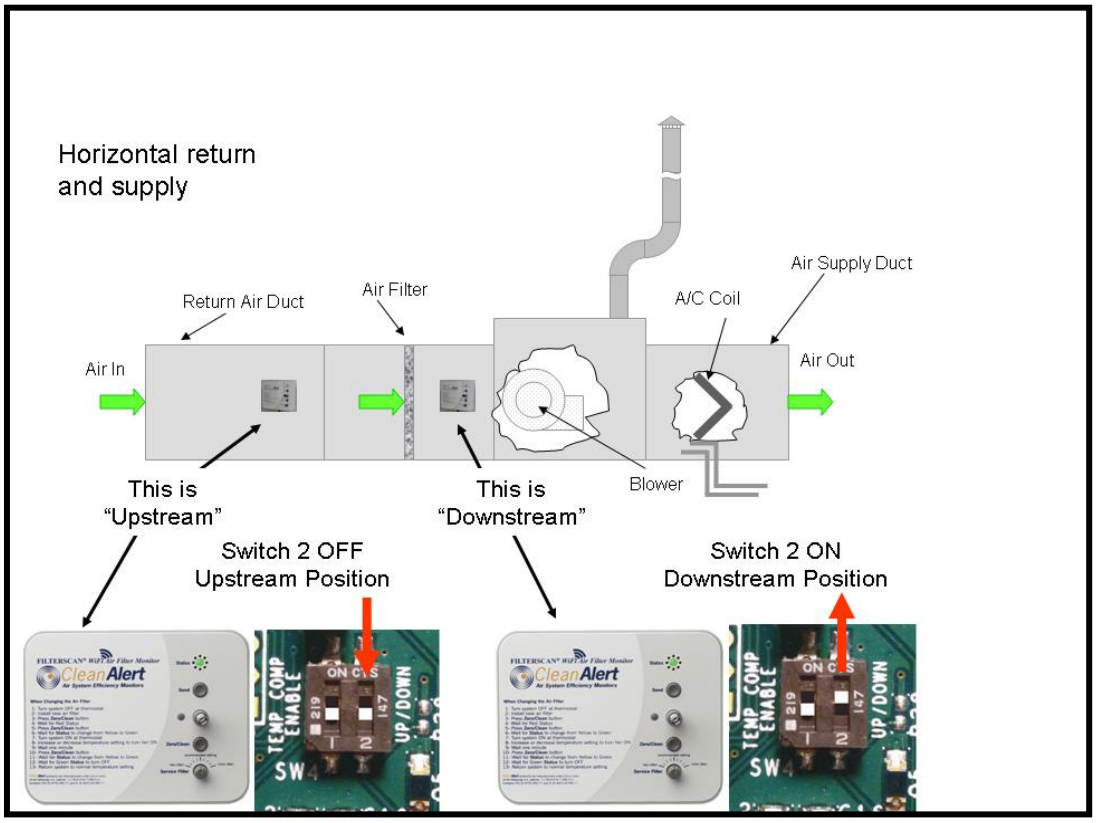

Figure 18: Installation on HVAC systems with horizontal return and supply ducts

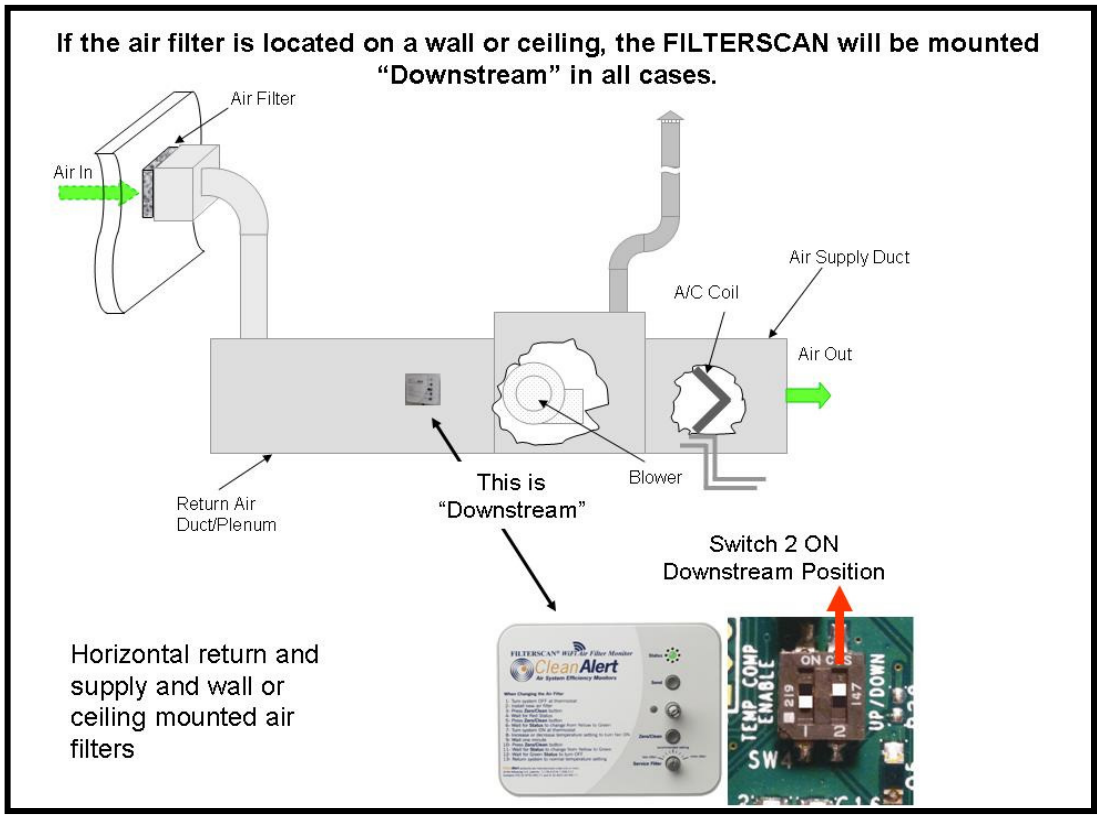

Figure 19: Installation on HVAC systems with wall or ceiling-mounted air filters

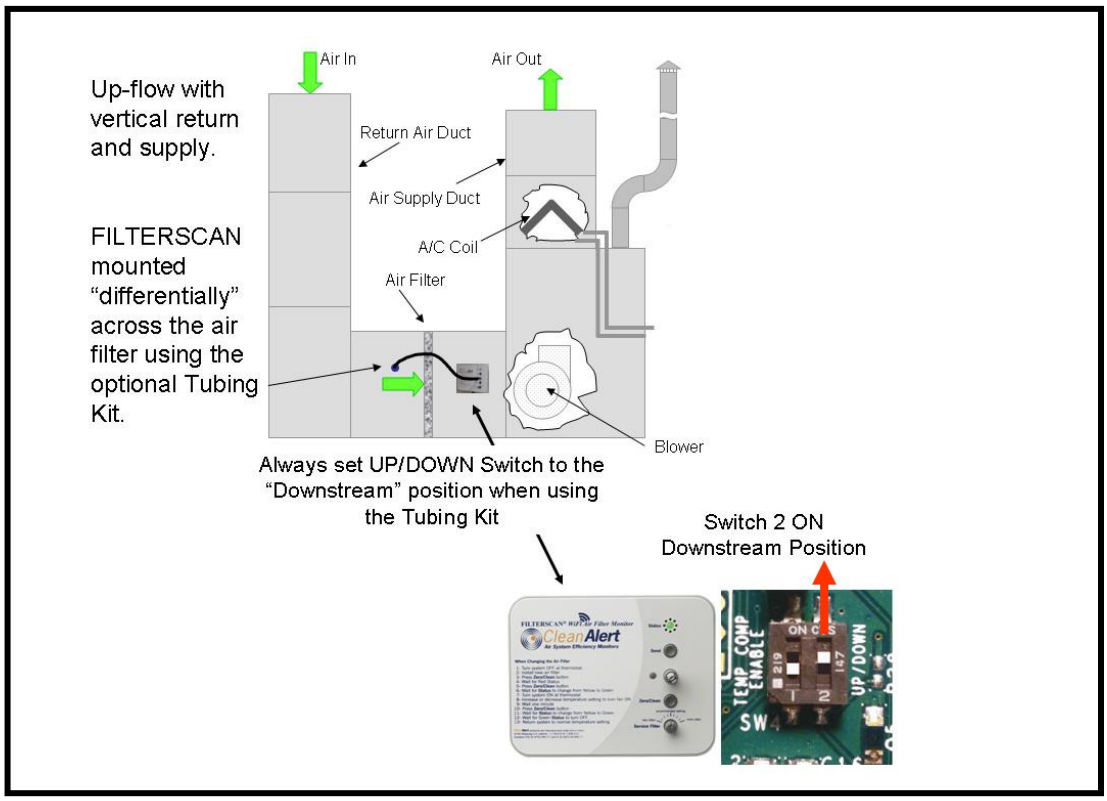

Figure 20: Installation of the optional CA-4DP Tubing Kit mounted differentially across the filter.

Optional Dry Contact Relay Output Operation

1. When connecting the relay output to an external building automation system (BAS) or alarm, it is recommended that the Common and Normally Closed contacts be used. This allows the external system or alarm to detect when the cabling is cut.
2. During a clog alarm, the relay will activate for one second, opening the Normally Closed contacts, and closing the Normally Open contacts.
3. Note: If the power is lost, there will be no relay indication of such power failure.

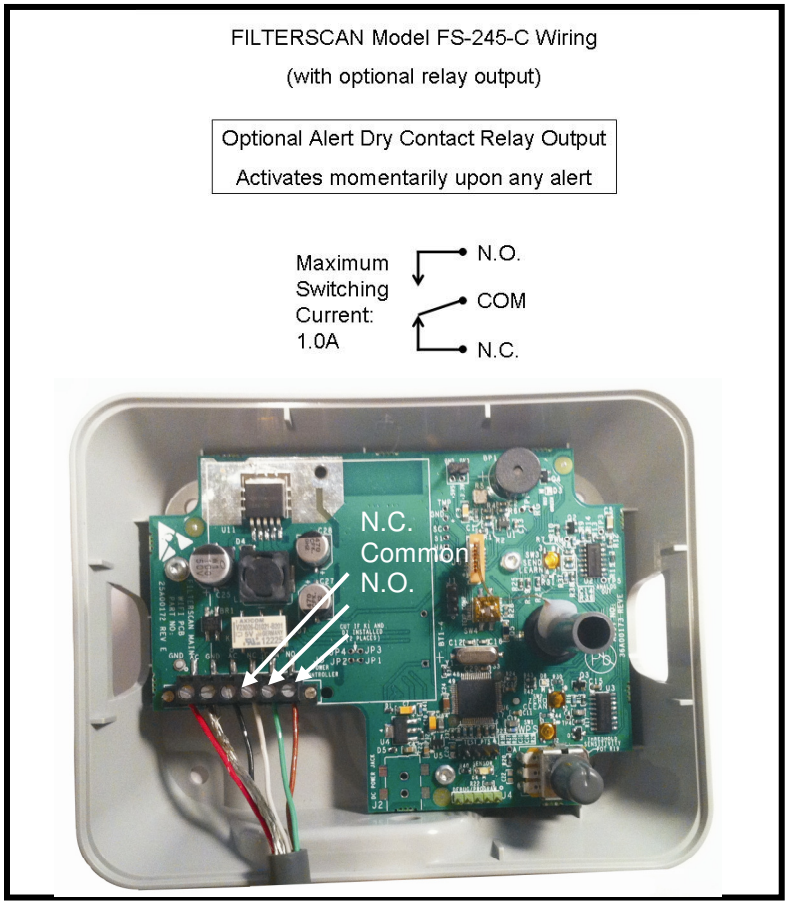

Figure 21: Model FS-245-C with Optional Relay Output

Disclaimer

While CleanAlert makes every effort to ensure the smooth operation of the **AirFilterSentry™ Notification Service** software, it makes no warranty as to its effectiveness for a particular purpose; and makes no warranty as to its availability, because it is hosted on a third party system over which CleanAlert has no control. CleanAlert will not be held accountable for any damage that may or may not result from the unavailability of this service.

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